

EMERGENCY PROTOCOL



EPIDURAL HEMATOMA

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INTRODUCTION

Epidural hematoma is a rare but potentially devastating complication most commonly associated with interlaminar and caudal epidural access procedures. The term “epidural hematoma” refers to bleeding within the epidural space. While the exact incidence of epidural hematoma following epidural access procedures is unknown, the serious consequences underscore the importance of recognition and vigilance for this potential complication. A neuraxial hematoma can lead to spinal cord or cauda equina compression, posing a significant threat of permanent neurological deficits, including paralysis, if not promptly recognized and treated. Factors such as procedure type, coagulopathy, anticoagulant use, traumatic needle insertion, and anatomical variations can increase the risk of hematoma formation. Early diagnosis and intervention, generally through imaging and urgent surgical decompression, are pivotal to optimizing patient outcomes [1,2].

TYPICAL PRESENTATION

A 55-year-old woman with lumbar spinal stenosis and a past medical history significant for atrial fibrillation presented for L4-5 interlaminar epidural steroid injection (ILES). She held her warfarin for 5 days before the procedure, and her pre-procedural international normalized ratio (INR) was 1.1. The procedure required three attempts to achieve loss of resistance but was otherwise uneventful.

No complications were noted during the procedure. The patient was monitored in the recovery room for 30 minutes following the procedure and was discharged home with post-procedural instructions and a scheduled follow-up visit in 4 weeks.

The patient called the office the following morning, complaining of the development of severe low back pain and bilateral lower extremity weakness that she noticed upon waking. The patient was directed to seek care in the emergency department (ED) and, upon presentation, had bilateral lower extremity weakness and difficulty ambulating.

DIAGNOSIS

Risk factors for epidural hematoma include difficulty with needle placement, underlying coagulopathy, anticoagulation, and anatomic abnormalities of the spinal cord or vertebral column [3]. The physician should consider risk factors for epidural hematoma when performing certain spine procedures; however, epidural hematomas have also occurred in the absence of known risk factors [4].

In addition to the risk conveyed during epidural catheter and spinal cord stimulator lead placement, clinicians must also be aware of the risk of epidural hematoma following catheter and lead removal [5].

The symptoms of epidural hematoma include moderate or severe back or neck

pain and sensory or motor deficit, as well as bladder symptoms (most often acute urinary retention followed by overflow incontinence), bowel incontinence, and saddle anesthesia [6,7]. The clinical presentation can vary depending on the hematoma's location. Low back pain with sensory and motor deficits in the lumbosacral spinal nerves may be typical, but other presentations, including pain as the sole symptom, have been documented [7]. Pain is often the first symptom. If there is concern for epidural hematoma, it is crucial not to delay diagnosis by waiting for the development of motor or sensory deficits.

The onset of symptoms can vary from immediate (intraprocedural) to delayed.

Although case reports have noted presentations occurring days to weeks following spine procedures, most cases present within 48 hours of the procedure [7,8]. Performing a detailed clinical evaluation, including a physical examination (if possible), is the optimal approach to early diagnosis of this condition.

Rapid diagnosis and emergency surgical treatment maximize neurological recovery [2]. MRI is the preferred diagnostic imaging modality, although CT may be used if MRI is contraindicated or unavailable [1]. If there is concern for epidural hematoma, prompt transfer to a hospital ED for MRI/CT imaging and spine surgical consultation is crucial.

EMERGENCY PROTOCOL

Protocol if symptoms present in the recovery area or during the procedure:

1. Symptoms are most likely to present during recovery. If signs/symptoms of epidural hematoma start during a procedure, immediately stop the procedure.
2. Perform clinical evaluation, including history and physical exam:
 - a. Obtain a clinical history:
 - i. Determine whether the patient has a significant increase in axial pain near the procedure site, weakness in the extremities, neurologic changes, or new bowel/bladder symptoms.
 - ii. Identify if the patient or procedure had any risk factors for epidural hematoma formation.
 - b. Conduct a thorough physical examination to assess for any neurological deficits.
3. If there is a clinical suspicion for epidural hematoma, transfer the patient to the ED for emergent MRI/CT imaging of the spine and spine surgery consultation.
4. Notify the patient's emergency contact or family.
5. Debrief the team and review procedural protocols to prevent future occurrences.

Protocol if symptoms present after the patient is discharged home (i.e, symptoms reported during a phone call or via a message in the electronic health record):

1. Obtain clinical history and perform chart review:
 - a. Obtain a clinical history:
 - i. Determine whether the patient is experiencing a significant increase in axial pain near the procedure site, weakness in the extremities, neurologic changes, or new symptoms affecting bowel/bladder function.
 - b. Identify if the patient or procedure had any risk factors for epidural hematoma formation.
2. If there is a clinical suspicion for epidural hematoma, advise that the patient seek immediate (urgent) evaluation in the ED for emergent MRI/CT imaging of the spine and spine surgery consultation.
3. If a facility is not equipped with the appropriate spine surgical services to treat an epidural hematoma, the patient should be immediately transferred to the nearest facility that can provide emergent spinal decompression if needed.
4. Debrief the team and review procedural protocol.

RISK MITIGATION/PREVENTION

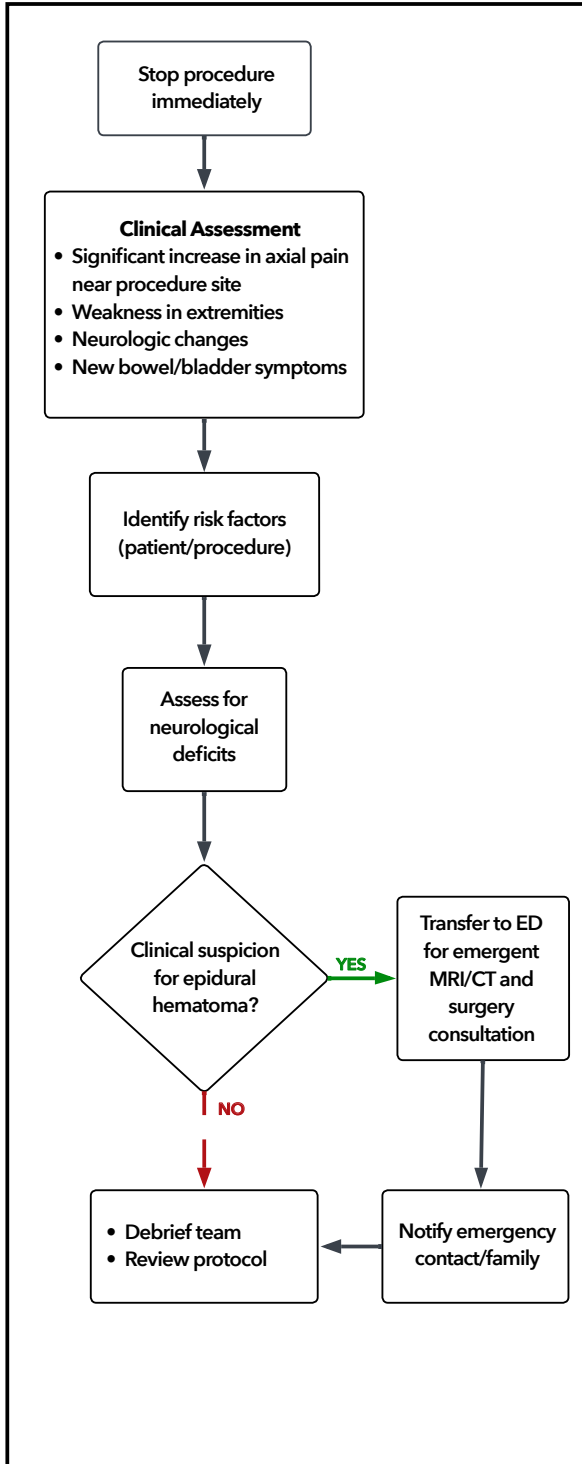
- Shared decision-making should occur between the patient and physician for any patient with an underlying coagulopathy or receiving anticoagulation who is undergoing certain interventional spine procedures, such as interlaminar or caudal epidural access procedures. This decision-making should be in accordance with published recommendations for the continuation vs. discontinuation of an antiplatelet agent or anticoagulant before a specified procedure [9]. Additional consultation with the patient's prescribing physician or hematologist may be warranted in some scenarios.
- Patients should be provided with a means to contact the clinic for post-procedural concerns.
- In patients presenting with signs/symptoms of an epidural hematoma, urgent MRI/CT imaging can lead to earlier diagnosis and treatment, which improves outcomes.
- If an epidural hematoma is confirmed on imaging, surgical consultation is required.
- Regardless of the service site, the facility should be appropriately equipped to manage emergencies (see **Advance Preparation for Emergencies** [10]).

KEY CONSIDERATIONS/TAKEAWAYS

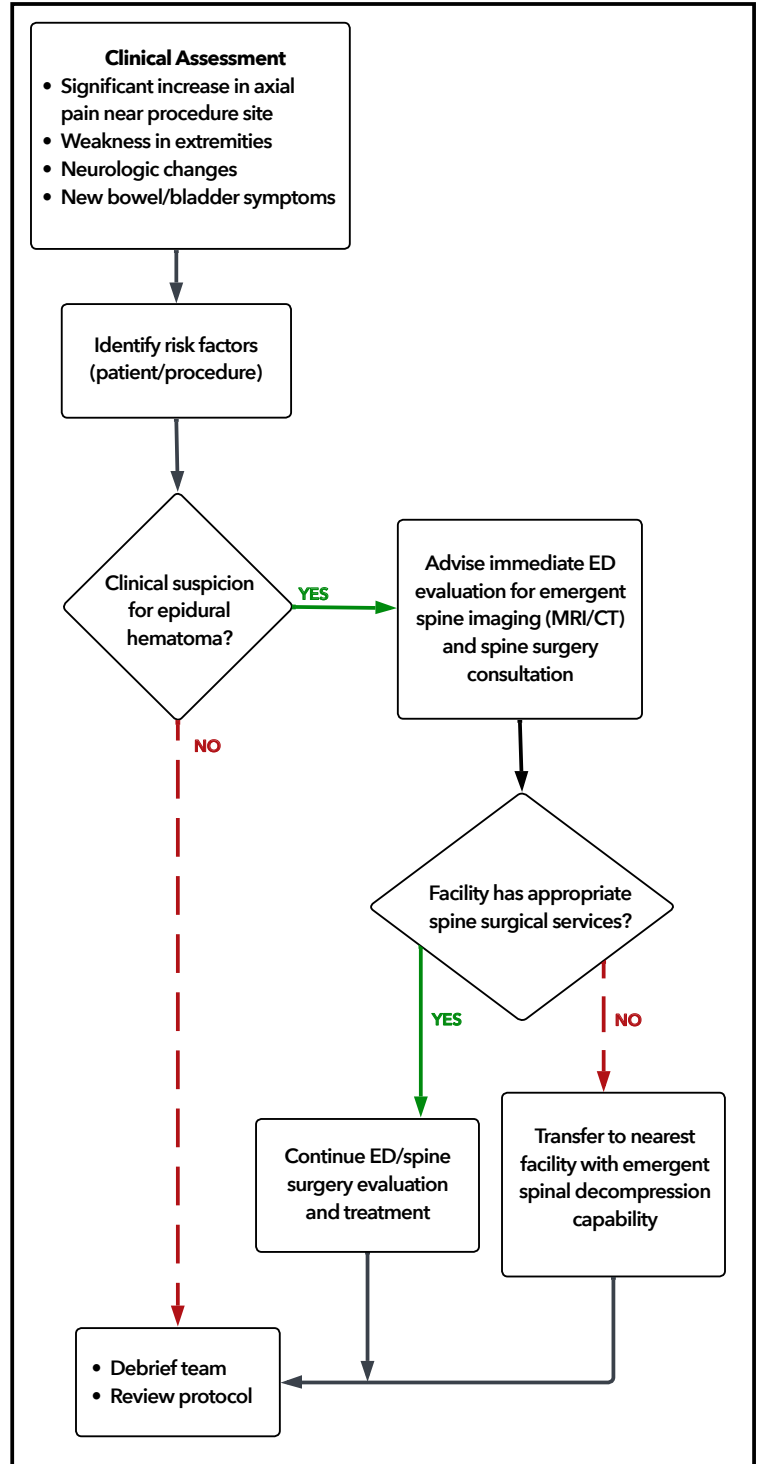
- Patients who develop a significant increase in axial pain near the injection site, weakness and/or sensory deficits in extremities, or new bowel/bladder symptoms following a spine procedure warrant further evaluation. Epidural hematoma should be first on the differential diagnosis list.
- The timing of symptom development can vary from intraprocedural to delayed. Vigilance for this complication is crucial.
- If there is clinical suspicion for epidural hematoma, advise the patient to seek immediate evaluation in the ED for emergent MRI/CT imaging and spine surgical consultation.
- Rapid diagnosis and emergent surgical treatment maximize the likelihood of neurological recovery.

SUSPECTED EPIDURAL HEMATOMA

DURING/IMMEDIATELY AFTER PROCEDURE



AFTER DISCHARGE



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DISCLAIMER

While these Emergency Protocols are intended to identify elements critical to the management of emergencies during interventional pain procedures, they are not intended to be inclusive of all proper emergency management protocols or exclusive of other methods of care reasonably utilized to obtain the same results. Nothing contained in these documents is intended to be used as a substitute for the care and knowledge of the individual clinician. They are guidelines based on evidence-informed expert consensus. IPSIS makes no representation and assumes no responsibility for the accuracy of the information contained or available through this website, and such information is subject to change without notice. Given the individual patient's clinical circumstances and preferences, the clinician's independent medical judgment should always determine patient care and treatment. Practitioners are advised to consider management options in the context of their training, background, and institutional capabilities when selecting recommended treatment options. IPSIS is not responsible, nor does it assume any legal liability or responsibility for the accuracy, completeness, clinical efficacy, or value of any such information or apparatus, product, or process described or referenced through this website or the information contained therein.